DIVISION 28 23 23

VAD7000 SERIES – FIBER OPTIC TRANSMITTER AND RECEIVER ENGINEERING SPECIFICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Fiber Optic FM Video, Audio, and Data Transceiver

1.02 SECTION INCLUDES

A. VAD7000 Series FM Video, Audio, and Data Transceiver – Standalone

B. VAD7000 - R3 Series FM Video, Audio, and Data Transceiver - Rack Mount

1.03 REFERENCES

A. Underwriters Laboratory (UL)

B. Underwriters Laboratory Canada (ULC)

C. European Union Compliance (CE)

1.04 SYSTEM DESCRIPTION

A. Performance Requirements: Provide a FM Video, Audio, and Data Transceiver system that transmits Bi-directional Video, Audio, Data.

1. The system shall utilize 850 nm optics capable of simultaneous bi-directional video, audio and data transmission on one single mode optical fiber. (VAD7010-A)
2. The system shall utilize 850 nm optics capable of simultaneous bi-directional video, audio and data transmission on one single mode optical fiber. (VAD7010-B)
3. The system shall utilize integrated WDM optics operating at 850/1300nm capable of simultaneous bi-directional video, audio and data transmission on one single mode optical fiber. (VAD7010WDM-A)
4. The system shall utilize integrated WDM optics operating at 1300/850nm capable of simultaneous bi-directional video, audio and data transmission on one single mode optical fiber. (VAD7010WDM-B)

1.05 SUBMITTALS

A. Product Data: Manufacturer's printed product data sheet for each type of Transmitter/Receiver specified.

B. Detail Drawings: Electrical and optical connect drawings. Product mounting template.

C. Manufacturer's Installation and Operating Manual: Printed installation and operating information for each type of Transmitter/Receiver specified.

D. Test Reports: Manufacturer's Printed Test Report via a Tektronics VM700A Video Test Generator verifying product performance meets or exceeds the specified product performance referenced in Part 2.

E. Warranty: Manufacturer's Printed Warranty

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in unopened factory packaging with Manufacturer's bar coding to the job site.

B. Inspect product upon delivery to assure that specified products have been received.

C. Store in original packaging in a climate controlled environment. Storage Temperature not to exceed: -40˚ C to +85˚ C

1.07 PROJECT/SITE CONDITIONS

A. Temperature Requirements: Products shall operate in an environment with an ambient temperature range of –40˚ C to +74˚ C without the assistance of fan-forced cooling.

B. Humidity Requirements: Products shall operate in an environment with relative humidity of 0% to 95% (non-condensing). If product is installed in condensation conditions, unit shall have conformal coating applied to the printed circuit board.

1.08 WARRANTY

A. Standard International Fiber Systems Comprehensive Lifetime Warranty: IFS warrants the product to be free of factory defects under manufacture's Lifetime Warranty as submitted under article 1.05 (E)

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Acceptable Manufacturer: International Fiber Systems, Inc.; 16 Commerce Road, Newtown, CT 06470 USA; Telephone: 203-426-1180; Fax 203-426-3326; Email: sales@ifs.com; Internet: www.ifs.com

B. Substitutions: Not Permitted

C. All fiber optic modules shall be supplied from a single manufacturer.

2.02 MANUFACTURED UNITS

A. Model Number Descriptions: Reference Table A: Product Number Descriptions

B. Model Compatibility Chart: Reference Table B: Product Compatibility Chart

2.03 GENERAL SPECIFICATIONS

A. The FM Video, Audio, and Data Transceiver system shall be an IFS VAD7000 series. The module shall be capable of transmitting full color video in real time in NTSC, PAL or SECAM formats. The module shall support the transmission of simplex or duplex audio as well as RS-232 / RS-422 data. The module shall be transparent to data protocols used by various manufacturers, providing for universal compatibility should future system expansion or changes be required. The module shall require no in-field electrical or optical adjustments or in-line attenuators to ease installation. The module shall transmit the video, audio and data signals using frequency modulation of the optical signal. The simultaneous video, audio and data transmission shall utilize an integrated WDM for increased stability and reliability of system performance. The module shall provide power, carrier detect, data transmit, data receive, audio transmit, audio receive and video status indicating LED's for monitoring proper system

operation. The modules shall provide automatic re-settable solid-state current limiters and independent voltage regulators on each module to reduce the chance of a single point failure of the system. The module shall be hot swappable in a rack mount system to reduce complete system shut down during maintenance or repair. The module shall have an MTBF of >100,000 hours and operate in an environment of –40˚ C to +74˚ C and relative humidity between 0% to 95% (non-condensing). The module shall be UL and ULC listed and CE marked. The circuit board shall be UL 94 flame rated and meet all PCI standards. All PC boards shall be designated with part number, PC board number and show appropriate revision number. Housing shall be of all metal construction. All LED indicators and both electrical and mechanical connections shall be identified with silk-screened labels. The module shall have a lifetime warranty to reduce system life cycle cost in an event of a module failure.

2.04 VIDEO SPECIFICATIONS

A. Input Video: 1 volt pk-pk (75 ohms)
B. Bandwidth: 5 Hz – 6.5 Mhz
C. Differential Gain: < 5 %.
D. Differential Phase: < 5°.
E. Tilt: <1%
F. Signal/Noise Ratio: >60dB

2.05 DATA SPECIFICATIONS

A. Data Interface: EIA RS-232, RS-422
B. Data Encoding: Unit shall be transparent to data encoding (i.e. NRZ, NRZI, Manchester, Bi-phase)
C. Data Rate: DC-100 kbps (NRZ)
D. Operation Mode: Simplex or Full Duplex

2.05(B) AUDIO SPECIFICATIONS

E. Input/Output: 2.2 volts peak – to - peak
F. Bandwidth: 20 Hz – 20 kHz
G. Input/Output Impedance: 600Ω
H. Total Harmonic Distortion: <1.0%

2.06 OPTICAL SPECIFICATIONS

A. IFS Model Number VAD7010
   1. Optical Fiber: 62.5/125 micron Multimode
   2. Number of Fibers Required: 2
   3. Optical Wavelength: 850nm
   4. Optical Power Budget: 14 dB
   5. Optical Attenuation: No manual adjustments required
B. IFS Model Number VAD7010WDM
   1. Optical Fiber: 62.5 /125 micron Multimode
   2. Number of Fibers Required: 1
   3. Optical Wavelength: 850/1300nm
   4. Optical Power Budget: 14 dB
   5. Optical Attenuation: No manual adjustments required

2.07 STATUS INDICATORS

A. Power: On/Red – Off/Off
B. Carrier Detect: Video Carrier Active/Yellow – No Video Carrier/Off
C. Data Transmit: Data Transmit/Green – No Data/Off
D. Data Receive: Data Receive/Yellow – No Data/Off
E. Audio Transmit: Audio Transmit/Green – No Audio/Off
F. Audio receive: Audio Receive/Yellow – No Audio/Off
G. Video In: Video In/Red – No Video/Off

2.08 CONNECTORS

A. Optical: ST
B. Power, Audio and Data: Terminal Block with Screw Clamps
C. Video: BNC (Gold Plated Center-PIN)

2.09 ELECTRICAL SPECIFICATIONS

A. Power: 24 VAC CT
B. Current Protection: Automatic re-settable solid-state current limiters
C. Voltage Regulation: Solid-state, Independent on each board
D. Circuit Board: UL 94 flame rated and meets all PCI standards.
E. Rack mount Card: Shall be hot-swappable with IFS Model Number R3 (EIA 19” card cage)

2.10 MECHANICAL SPECIFICATIONS

A. Surface Mount Dimensions:
VAD7010, VAD7010WDM: 7.” x 4.9” x 2.0” (17.8 cm x 12.5 cm x 5.1 cm)
B. Rack Mount Dimensions:
VAD7010, VAD7010WDM: 7.7” x 5.0” x 2.0” (19.6 cm x 12.7 cm x 5.1 cm)
C. Number of Rack Slots: 2
D. Finish: Module shall be constructed of a metal enclosure with a powder coat finish model Number F63B12 with all connections and indicators silk-screened directly on unit. Rack mount units shall be constructed of anodized aluminum.
E. Weight: <2.0 lbs./1.0kg

2.11 ENVIRONMENTAL SPECIFICATIONS

A. MTBF: >100,000 Hours
B. Operating Temp: –40˚ C to +74˚ C
C. Storage Temp: -40˚ C to +85˚ C
D. Relative Humidity: 0% to 95% (non-condensing). If product is installed under condensation conditions, unit shall have conformal coating applied to the printed circuit board. (Add –C to model number for conformal coated printed circuit board)

2.12 REGULATORY AGENCIES/APPROVALS AND LISTINGS

A. Underwriters Laboratory (UL) Listing Number: I.T.E. 6D16
B. Underwriters Laboratory Canada (ULC) Listing Number: I.T.E. 6D16
C. UL 94-flame rated PCB board: 94VO
D.

2.13 ACCESSORIES

A. Card Cage: IFS Model Number R3 (EIA 19" card cage) shall be available to house and power rack mount modules.
B. Blank Panels: IFS Model Number R3-BP shall be available to cover unused rack slots.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Inspect modules before installation.
B. Modules shall be free of any cosmetic defects or damage.
C. All optical connectors shall be covered with dust caps and remain on the module until installing cable connectors to module.
D. Shipping box shall include the module, power supply and operations manual.

3.02 PREPARATION

A. Standalone Module (Surface Mount)
    1. Shall be mounted on a properly prepared surface adequate for the size and weight of module. The placement of the unit shall allow provision for cable installation and maintenance as indicated on the approved detail drawings and in compliance with the IFS mounting template and installation manual.
B. Rack Mount Module (19" Rack)
    1. Shall be installed in the IFS Model Number R3 card cage. Ensure the card cage is installed in a standard EIA 19" (482.6 mm) rack or wall standoff bracket adequate for the size and weight of the card cage. The placement of the unit shall allow provision for cable installation and maintenance as indicated on the approved detail drawings and in compliance with the IFS installation manual.
C. Optical Fibers
    1. Caution: NEVER look into the end of an active optical fiber when using laser light output. Eye damage can occur. Wear eye protection when cleaving, terminating, and splicing fiber.
    2. The number and type (multimode or single-mode) of optical fiber shall meet the requirements of the IFS model number in article 2.06 used in the installation.
    3. All optical fiber cables shall be properly installed and terminated with the mating optical connectors as submitted in article 2.08 (A).
    4. The optical link shall be tested with either a power meter, at a minimum, or OTDR to ensure the link budget (overall path loss) plus an added 3dB of optical safety margin does not exceed the optical power budget as submitted in article 2.06.
    5. All optical connectors on cable shall be cleaned in compliance to optical connector manufactures specifications and covered with dust caps until connection to the fiber optic module.

3.03 INSTALLATION

A. General: Locate fiber optic modules as indicated on the approved detail drawings and install module in compliance with the IFS installation and operations manual.

3.04 TESTING

A. Testing the Fiber Optic Video Link.
    1. Verify that the coax and optic fibers are properly connected.
    2. Make sure that power is applied to all fiber optic modules, camera, and video monitor or other equipment used in the system.
    3. The carrier detect indicator LED should be lit confirming a presence of a carrier signal.
    4. Successful video link operation should be visible at this point as witnessed by a good quality video picture on the monitor.
B. Testing the Fiber Optic Audio Link
    1. Verify that the audio leads and optical fibers are properly connected.
    2. Make sure that power is applied to all fiber optic modules, Pre-amplifiers, amplifiers or other equipment used in the system.
    3. Successful audio link operation should be confirmed at this point.
C. Testing the Fiber Optic Data Link.
    4. Verify that the data leads and optical fibers are properly connected.
    5. Make sure that power is applied to all fiber optic modules, controllers, and receiver drivers or other equipment used in the system.
    6. Successful data link operation should be confirmed at this point by using the controller to pan, tilt, and zoom the camera or communicate with other equipment.

3.05 CLEANING

A. Follow all instructions for proper use of solvents and adhesives used for termination and splicing.
B. At completion of the installation, dispose of all fiber scraps properly.

MANUFACTURED UNITS REFERENCE TABLES

Table A: Product Number Descriptions

VAD7000 SERIES	DESCRIPTION	MAX. DISTANCE*
VAD7010	MM Video / Audio / Data – 850 <> Video / Audio / Data – 850, 2 Fibers	2.5 Miles (4KM)
VAD7010-R3	MM Video/ Audio / Data – 850 <> Video / Audio / Data – 850, 2 Fibers, Rack Mount	2.5 Miles (4KM)
VAD7010WDM-A	MM Video / Audio / Data – 850 <> Video / Audio / Data – 1300, 1 Fiber	2.5 Miles (4KM)
VAD7010WDM-A-R3	MM Video/ Audio / Data – 850 <> Video / Audio / Data – 1300, 1 Fiber, Rack Mount	2.5 Miles (4KM)
VAD7010WDM-B	MM Video / Audio / Data – 1300 <> Video / Audio / Data – 850, 1 Fiber	2.5 Miles (4KM)
VAD7010WDM-B-R3	MM Video/ Audio / Data – 1300 <> Video / Audio / Data – 850, 1 Fiber, Rack Mount	2.5 Miles (4KM)

* Maximum distance is limited to optical loss of the fiber and any additional loss by connectors, splices and patch panels.

Table B: Product Compatibility Chart

TRANSCEIVER	COMPATIBLE TRANSCEIVER
VAD7010	VAD7010, VAD7010-R3
VAD7010-R3	VAD7010, VAD7010-R3
VAD7010WDM-A	VAD7010WDM-B, VAD7010WDM-B-R3
VAD7010WDM-A-R3	VAD7010WDM-B, VAD7010WDM-B-R3
VAD7010WDM-B	VAD7010WDM-A, VAD7010WDM-A-R3
VAD7010WDM-B-R3	VAD7010WDM-A, VAD7010WDM-A-R3

END OF SECTION